

# Implementation of Cardboard Recycling Program at Johnson Space Center

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# Topics

- Overview of Center Operations and Activities
- Former Program - Problem Definition
- Implementation Approach
- Lessons Learned
- Work Continues

# Center Operations and Activities

- JSC resides on approximately 1,600 acres
- Over 200 buildings site-wide which house over 10,000 employees (civil servant & contractor)
- JSC primary functions include:
  - Mission Control
  - Research and Development
  - Astronaut Training
- Two satellite facilities located 6-7 miles from JSC:
  - Flight Crew Operations located at EF
  - Neutral Buoyancy Lab located at the SCTF

# Former Program - Problem Definition

- JSC has had an “informal” (no written requirements) and “inconsistent” (some buildings rely solely on custodial staff to recycle while other buildings actively involve the employees in recycling) Cardboard Recycling Program for many years. Several impediments have hampered the program’s effectiveness:
  - Lack of Employee Awareness and Training: majority of employees are unaware of how to recycle cardboard or that a program even exists.
  - Size of the Center (JSC, EF, SCTF) and Complexity of Operations: often difficult to determine which buildings generate large volumes of cardboard based on their activities and operations. Satellite facilities (EF & SCTF) require additional off-site coordination.
  - Number and Location of Existing Cardboard Recycling Carts: limited number of cardboard recycling carts placed at various inconspicuous locations across the Center. Not everyone knows where the carts are or that everyone can utilize them.



# Former Program - Problem Definition (continued)

- Cart Design and Ease of Use: few wooden cardboard recycling carts currently in use are deteriorating due to weathering or misuse.
- Frequency and Efficiency of Cardboard Pick-up: no established pick-up schedule or monitoring of cart's usage.
- Minimal Internal Coordination and Communication between Environmental Office and Custodial Staff: no “feed-back mechanism” between EO and Custodial Department.
- Ineffective Contract Language or Standard Operating Procedures: lack of strong contract language or site-wide procedures describing requirements to recycle cardboard and process to recycle.
- Lack of Resources (funding and personnel): no designated recycling coordinator (“other duties as assigned”) and not enough carts site-wide (piece-meal funding for purchase of additional carts).

# Implementation Approach

- In order to establish a formal, effective program, the following steps were taken. Note that a Cardboard Recycling Implementation Plan was developed incorporating the results of the site assessments, surveys, training, cart deployment, etc. discussed below.
- Conducted Site Assessments: the Environmental Office conducted site assessments at JSC, EF, and the SCTF. Consisted of visual inspections including photographs of all buildings (inside and outside), dumpsters, and cardboard recycling carts (if provided) along with interviews of building occupants and facility managers.
- Purpose of the site assessments were to determine:
  - 1) Those buildings that generate large volume of cardboard
  - 2) Disposition of cardboard once generated (recycled or thrown away)
  - 3) Areas/buildings in need of new recycling carts
  - 4) Level of training needed for custodial staff who pick-up the cardboard
  - 5) Level of awareness needed to increase recycling among employees

## Cardboard Recycling Site Assessment Checklist

General Information			
	Meet with Facility Manager to review results of site assessment and survey (if available) add additional comments		
Date:	1/7/04 & 1/22/04		
Time:	1:10pm		
Site*:	JSC		
Bldg No:	8 clinic		
Directorate(s):			
Facility Manager:	Stephen Candler		
<b>Visual Inspection of Bin</b> (circle all that apply, take photos & provide additional comments as necessary)			
Bin Available:	Yes <input checked="" type="checkbox"/>	No	
Bin Needed:	Yes	No <input checked="" type="checkbox"/>	
Bin Location:	Inside	Outside	Next to Roll-off/Dumpster
Describe Location:	Stored in a covered area (outside but under building loggia) <input checked="" type="checkbox"/> (e.g. South of B9 in driveway next to dumpster)  outside clinic entrance		
Bin Type:	Covered Wood <input checked="" type="checkbox"/>	Uncovered Plastic	Wheels <input checked="" type="checkbox"/> Brakes
Bin Size (approx):	Length 9'	Width 3-1/2'	Height 4'
Bin Accessibility:	Hard to Reach	Easy to Reach <input checked="" type="checkbox"/>	
Bin Condition:	Good	Some Deterioration <input checked="" type="checkbox"/>	Needs Replacing
Bin Signage:	Exists On bin	Doesn't exist <input checked="" type="checkbox"/>	
Bin Contents:	Cardboard Only	Cardboard plus other items (list them) plastic strapping and styrofoam peanuts	
Bin Capacity:	Empty Overflowing	Half Full	Full <input checked="" type="checkbox"/>
Cardboard Flattened:	Yes	No	Some of it <input checked="" type="checkbox"/>
<b>Visual Inspection of Building</b> (circle one, provide additional comments as necessary)			
Are the exterior surroundings of the building neat and tidy?	Take Photos	Yes <input checked="" type="checkbox"/>	No
Are empty cardboard boxes found in the roll-offs and/or dumpsters?		Yes	No <input checked="" type="checkbox"/>
If "yes", approximately how many? Take Photos			
Are empty cardboard boxes found on the loading docks?		Yes	No <input checked="" type="checkbox"/>
If "yes", approximately how many? Take Photos			
Are empty cardboard boxes found in the interior building trash receptacles?		Yes	No <input checked="" type="checkbox"/>
If "yes", approximately how many? Take Photos			
If empty computer boxes are found on the loading dock or inside the building, locate Facility Manager and discuss how these types of boxes are handled:	<ol style="list-style-type: none"> <li>Recycled the same as other cardboard</li> <li>Returned to the vendor for reuse</li> <li>Thrown in the trash</li> <li>Unsure</li> </ol>		
<b>Additional Notes /Comments</b>			
A lot of the boxes are reused for shipping			



# Implementation Approach (con't)

- Conducted Site Surveys: in conjunction with the site assessments, the Environmental Office developed a survey that was sent to facility managers and alternate facility managers.
- Purpose of the surveys were to determine:
  - 1) If building occupants knew that a Cardboard Recycling Program currently existed?
  - 2) If building occupants knew Federal agencies were required to recycle cardboard?
  - 3) If building occupants knew of the Agency goals to reduce solid waste?
  - 4) What specific operations within buildings generated the most cardboard?
  - 5) What building occupants were doing with cardboard if not recycling it?
  - 6) How to improve participation of cardboard recycling among employees?





## JSC Cardboard Recycling Survey

The purpose of this survey is to assist the Environmental Office in assessing the effectiveness of JSC's Cardboard Recycling Program. The results of this survey will be used as a tool to evaluate:

- buildings that generate the greatest volume of cardboard
- disposition of cardboard – is it recycled or thrown in the trash
- areas or buildings in need of new cardboard recycling bins
- level of training needed for the custodial staff who pick-up the cardboard
- level of awareness needed to increase cardboard recycling among site users

*Instructions: Please complete the survey by 02/27/04.*

*Return completed survey to: Terri Bradshaw @ [Terri.L.Bradshaw1@jsc.nasa.gov](mailto:Terri.L.Bradshaw1@jsc.nasa.gov) or mail hardcopy to: Terri Bradshaw JA 330 / B330 / R115.*

*Any questions regarding this survey can be directed to:*

*Sandy Parker – 281-483-3119 – [Sandra.A.Parker@nasa.gov](mailto:Sandra.A.Parker@nasa.gov)  
Terri Bradshaw – 281-483-7936 – [Terri.L.Bradshaw1@jsc.nasa.gov](mailto:Terri.L.Bradshaw1@jsc.nasa.gov)*

*To put an "X" in the appropriate answer box, just click on the appropriate square.*

*To type responses or comments to certain questions, just double click in the text box and begin typing.*

- Does your building have a cardboard recycling bin?  
☐ Yes ☐ No ☐ I don't know
- If "yes" to #1, is the cardboard recycling bin outdoors or indoors, covered or uncovered?  
☐ Outdoors ☐ Indoors  
☐ Covered ☐ Uncovered
- If "no" to #1, does your building need a cardboard recycling bin?  
☐ Yes ☐ No
- Are you aware of the federal mandate (Executive Order 13101 – Greening the Government through Waste Prevention, Recycling and Federal Acquisition) requiring federal agencies to recycle cardboard?  
☐ Yes ☐ No
- Are you aware that federal agencies (including NASA) are subject to Environmental Protection Agency (EPA) inspections and audits in order to evaluate which facilities are in compliance with Executive Order 13101?  
☐ Yes ☐ No

- Are you aware of the NASA Agency goal to divert 35% of its solid waste from the landfill by 2010?  
☐ Yes ☐ No
- Did you know that JSC has a Cardboard Recycling Program?  
☐ Yes ☐ No
- Do you know where to find information about JSC's Cardboard Recycling Program?  
☐ Yes ☐ No
- Does your area or operation generate cardboard as a waste (i.e. do you receive office supplies / other equipment or supplies in cardboard boxes)?  
☐ Yes ☐ No
- If "yes" to #9, can you estimate the amount of cardboard your area / operation generates?  
☐ 1 to 3 boxes (any size) per week  
☐ 4 to 10 boxes (any size) per week  
☐ 11 to 50 boxes (any size) per week  
☐ over 50 boxes (any size) per week
- Questions 11 and 12 are specific to computers and computer equipment. If your area or operation receives computers and computer equipment in cardboard boxes, do you know what happens to the empty boxes?  
☐ the contractor installing the equipment keeps the empty boxes  
☐ the empty boxes are thrown in the trash  
☐ the empty boxes are recycled like any other cardboard box  
☐ I don't know what happens to the empty computer boxes
- Are you aware of any "informal process" your building or area may have in handling empty cardboard computer boxes? If "yes" please provide a brief description of the process in the text box below.  
☐ Yes ☐ No
- Question 13 is specific to Custodial Staff only (skip to #14 if this question does not apply to you). How do you handle empty cardboard computer boxes?  
☐ they are returned to the contractor installing the equipment  
☐ they are thrown in the trash  
☐ they are recycled like any other cardboard box
- If you break down and flatten your cardboard, write "recycle" on it, and place it by your trash can, does the custodial staff pick it up?  
☐ Yes ☐ No ☐ I've never done this

# Implementation Approach (con't)

- *Developed Cardboard Recycling Training Modules:*  
two separate training modules were developed.
  - 1) Module One – Facility Managers and Building Occupants
    - Environmental Excellence Policy
    - Compliance with Regulatory and Agency Requirements
    - How the Cardboard Recycling Program Works
    - Cart Specifications
    - Hands-on Exercise of How to “Ready” Cardboard for Recycling
    - Program Contacts
  - 2) Module Two – Custodial Staff
    - Same topics as above but also discusses the operations of collecting cardboard from designated areas within buildings, handling large boxes to cumbersome to break down, and how to accommodate those buildings that generate a minimal amount of cardboard each month.

# Implementation Approach (con't)

- *Develop Requirements for Complying with Cardboard Recycling:*  
Specific requirements for recycling and managing solid wastes were developed and published in the JSC Environmental Compliance Procedural Requirements (JPR 8550.1). An entire chapter focuses on the various recycling programs (white paper, cardboard, scrap metal, etc.) and details the procedures in which all site-wide employees (JSC, EF, SCTF) are required to comply with.
- *Form a Cardboard Recycling Working Group:* In an effort to partner and promote environmental stewardship on-site, a working group was formed between the Environmental Office and the Custodial Department. Purpose is to ensure efficiency and continual improvement of the Cardboard Recycling Program.



# Implementation Approach (con't)

- Purchase Additional Cardboard Recycling Carts:

Due to limited funding, the EO was able to initially purchase twenty new carts.

Information gathered from the site assessments and surveys was used to determine which buildings would receive new carts. Buildings that generated over 50 boxes per week were given first priority. Carts are placed by dumpsters or in a central location. A pick-up schedule was developed for those buildings receiving carts and published on the environmental web-site.



# New and Old Cardboard Recycling Carts

New Cardboard Recycling Carts are constructed of recycled plastic, have two stationary wheels, two lockable wheels, and are covered.



Old Wooden Cardboard Recycling Carts are uncovered and were stored indoors due to new storm water requirements and safety issues.



# Lessons Learned

- Employees want to and will recycle if you provide the tools and training!
- Program must be flexible enough to accommodate diverse operations such as buildings with 60-80 labs and buildings that generate extremely large, cumbersome boxes. Be able to provide tailored process!
- Expect “growing pains” with any new program.....such as cart placement, pick-up frequency, minor safety incidents.
- Received positive feedback and support from JSC population, along with improvement suggestions and offers to join our recycling team!

# Lessons Learned (continued)

- New partnerships will be formed! This program enabled the EO to work with Logistics and incorporate their process for handling empty move boxes into our training. As a “spin-off” of the cardboard recycling program, Logistics purchased re-usable plastic move crates as a P2 initiative.
- Also allowed us to work with the Information Resources Directorate and provide training on what to do with empty computer boxes.



# Work Continues

- Evaluate collection and pick-up methods for efficiency
- Perform life cycle cost/analysis for baler or additional compactor
- Evaluate collection point for reuse of packing materials
- Develop incentives or award program – seeking input or suggestions from other Centers on this one!